REMARKS

Claims 1-31 are pending in the present application. Claims 1, 6, 22, 23, 25 and 30 are independent. Reconsideration in view of the above amendments and following remarks is respectfully requested.

Claim Rejections

Claims 17, 19 and 21 have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite. Applicants have amended claims 17 and 19-21 to correct the dependency and thereby alleviate the problems with antecedent basis. Accordingly, Applicants respectfully request that the rejection be withdrawn.

Claims 1, 6, 9, 10, 12, and 18 have been rejected under 35 U.S.C. §102(b) as being anticipated by Sony (JP 10-209573 A; see also related U.S. Patent 6,233,266 B1). Applicants respectfully traverse this rejection.

JP 10-209573

JP 10-209573 is directed to a semiconductor laser. Relying on Figure 4 of the equivalent U.S. Patent 6,233,266, related Figure 1 of JP 10-209573 discloses semiconductor layers as follows:

Substrate 2; n-type cladding layer 3; lower guide layer 4; quantum well 15 made up of alternating sub layers 5 and 6, upper guide layer 7; pair of undoped cladding layers 8, diffusion prevention layer 9 between the pair of cladding layers 8, p-type doped cladding layer 10, contact layer 11, strip structure for current confinement 12, and p-electrode 14 and n-electrode 13. (see generally columns 3 and 4, with respect to Figure

4). Furthermore, again relying on U.S. Patent 6,233,266, column 5, lines 6-15, a method for forming the diffusion preventing layer 9, is disclosed.

Claims 1 and 6

Claim 1 is directed to a semiconductor laser device. Applicants respectfully submit that JP 10-209573 fails to teach or suggest at least wherein a spacer layer is provided between said optical guide layer and said at least one of the cladding layers, said spacing layer having an interface between the spacing layer and said optical guide layer.

The Examiner alleges that the spacer layer is met by element 9 in Figure 4. However, that diffusion preventing layer 9 is formed on a cladding layer 8, and not formed on an optical guide layer, forming an interface there between, as in the present claimed invention. Thus, for at least this reason, Applicants submit that JP 10-209573 does not anticipate claim 1. Similarly, Applicants submit that JP 10-209573 also does not anticipate claim 6, at least for failing to teach the limitation, "wherein an interface is formed between said spacer layer and said optical guide layer."

Accordingly, withdrawal of the rejection regarding each of independent claims 1 and 6 is respectfully requested.

Claims 9, 10, 12, 18

Claims 9, 10, 12 and 18 are also not anticipated by JP 10-209573 at least for the reasons above for claims 1 and 6.

Claims 2, 3, 5, 7, 8, 11, 13-17, 19, 21

Claims 2, 3, 5, 7, 8, 11, 13-17, 19 and 21 have been rejected under 35 U.S.C. 103(a) and being unpatentable over JP 10-209573. Applicants respectfully traverse that rejection.

At least for the reason given above for claims 1 and 6, JP 10-209573 fails to teach or suggest all claimed elements of the dependent claims for claims 1 and 6.

Claims 4 and 22

Claims 4 and 22 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the combination JP 10-209573 and Ohba et al. (U.S. Patent 5,034,957, hereinafter Ohba). Applicants respectfully traverse that rejection.

Ohba

Ohba is directed to a semiconductor laser device using double heterostructure, and in particular having a suitable composition capable of preventing carrier leakage. Among other things, Ohba teaches an approach to controlling the carrier concentration in the active layer based on setting the carrier concentrations in the n-type cladding layer and the p-type cladding layer (see column 7, lines 10-27). The basic structure for the double heterostructure semiconductor laser device (see Figure 5) is composed of, beginning from the n-electrode up to the p-electrode, a substrate (11), n-type buffer layer (12), n-type cladding layer (13), active layer (14), p-type cladding layer (15), cap layer (16), n-type block layer (17), and contact layers (18 and 19). In the contact layer (18), a stripe-shaped current pinching section (30) confining entering currents.

Differences over Ohba

The Office Action relies on Ohba for teaching the missing carrier concentration for the spacer. Applicants submit, however, that Ohba fails to teach or suggest at least "a carrier concentration at an interface between said spacer layer and said optical guide layer is more than 5 x 10^{16} cm^{-3} and less than 5 x 10^{17} cm^{-3}." Ohba does not, for example, teach a spacer layer, much less an interface between a spacer layer and an optical guide layer. As can be seen in Figure 5, the active layer is surrounded by cladding layers. There is no spacer layer between that active layer and either of the cladding layers. Accordingly, Applicants submit that Ohba does not make up for the deficiency as alleged in the Office Action. Applicants respectfully request that the rejection be withdrawn.

New Claims

New claims 23-31 have been added. Claim 23 is comparable to the combination of original claims 1 and 2. Claim 24 consists of the subject matter of original claim 4. Claim 25 is comparable to the combination of original claims 1 and 4. Claims 26 and 27 are directed to the subject matter of original claim 3. Claims 28 and 29 are directed to the subject matter of original claim 5. Claim 30 is comparable to the combination of original claims 6 and 7. Claim 31 consists of the subject matter of original claim 8. Applicants submit that no new matter has been added.

Each of the added independent claims 23, 25 and 30 recite the limitation that the spacer layer is in contact with both the optical guide layer and the p-type cladding layer. Because JP 10-209573 discloses a diffusion preventing layer 9 formed on a cladding

layer 8, and not in contact with an optical guide layer, it does not disclose the claimed structure and method of the added new claims.

CONCLUSION

The Examiner is respectfully requested to reconsider and withdraw the corresponding rejections of claims 1-22 at least for the above reasons and to allow all of the now pending claims 1-31.

Favorable reconsideration and an early Notice of Allowance are earnestly solicited.

In the event there are any outstanding matters remaining in this application, the Examiner is invited to contact Robert Downs at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachments: Marked up copy of the claims

Marked-up copy of the Claims

1. (Twice Amended) A semiconductor laser device having a quantum well active layer disposed between a pair of cladding layers, and an optical guide layer disposed between at least one of the cladding layers and the quantum well active layer,

wherein a spacer layer is provided between said optical guide layer and said at least one of the cladding layers, said spacer layer having an interface between the spacer layer and said optical guide layer.

4. (Amended) A semiconductor laser device according to claim 2, wherein said spacer layer has a p-type electrical conductivity, and a carrier concentration at [an] said interface between said spacer layer and said optical guide layer is more than 5×10^{16} cm^{-3} and less than 5×10^{17} cm^{-3}.

6. (Amended) A method of manufacturing a semiconductor laser device, comprising the steps of sequentially forming, on an n-type substrate, an n-type doped buffer layer, an n-type doped cladding layer, a first undoped optical guide layer, an undoped quantum well active layer, a second undoped optical guide layer, p-type doped cladding layer, and a p-type doped cap layer by vapor phase growth method, further comprising:

forming an undoped spacer layer between said second undoped optical guide layer and said p-type doped cladding layer,

wherein an interface is formed between said spacer layer and said second undoped optical guide layer.

17. (Amended) The method of manufacturing a semiconductor laser device of claim [15] 16, wherein said stripe-shaped ridge has a width of 2 - 3 μm.

19. (Amended) The method of manufacturing a semiconductor laser device of claim [17] 18, wherein said stripe-shaped ridge has a width of 4 - 5 μm.

20. (Amended) The method of manufacturing a semiconductor laser device of claim [17] 18, wherein said step of forming an n-type current block layer comprises forming an n-type electric current block layer and said n-type current block layer.

21. (Amended) The method of manufacturing a semiconductor laser device of claim [19] 20, wherein said stripe-shaped ridge has a width of 2 - 2.5 μm.